

# Spectrum of Anxiety Disorders Among Medical Students in a Nigerian Medical School: A Cross-Sectional Study With Standardized Screening Tools

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Received: June 20, 2018 Accepted: August 3, 2018 Online Published: September 3, 2018

doi:10.5539/jedp.v8n2p132

URL: <http://doi.org/10.5539/jedp.v8n2p132>

## Abstract

**Background:** Anxiety disorders among medical students constitute a global problem, and also reflect the mental state of the general population. There is paucity of data on the spectrum of such disorders among medical students in Nigeria.

**Aim:** The study aims to determine the prevalence of anxiety disorders among medical students, and the effect of socio-demographic characteristics.

**Methods:** A total of 217 medical students from the second to the final years of study at Enugu State University of Science and Technology in south-east Nigeria were enrolled by simple random sampling. Five pretested, self-administered standardized questionnaires were used as screening tools for anxiety disorders. Data were analyzed using the Statistical Package for Social Sciences program (SPSS version 20). A p-value less than 0.05 was taken as statistically significant.

**Results:** Thirty one (14.3%) of the enrolled medical students fulfilled the screening criteria for anxiety disorders. Specifically, generalized anxiety disorder (GAD) was significantly related to gender ( $p = 0.017$ ) and the year of study ( $p = 0.017$ ). Post-traumatic stress disorder (PTSD) was significantly related to the year of study ( $p = 0.037$ ), and social anxiety disorder (SAD) to the year of study ( $p = 0.003$ ) and gender ( $p = 0.04$ ). Similarly, panic disorder was significantly related to the year of study ( $p = 0.025$ ) while specific phobia was significantly associated with marital status ( $p = 0.003$ ), parental monthly income ( $p = 0.022$ ) and student's monthly allowance ( $p = 0.002$ ). Finally, obsessive-compulsive disorder was significantly related to marital status ( $p = 0.034$ ) and year of study ( $p = 0.028$ ).

**Conclusion:** Medical students in Nigeria are prone to a spectrum of anxiety disorders. This susceptibility is influenced by socio-demographic characteristics.

**Keywords:** anxiety disorders, medical students, standardized questionnaires, Nigeria

## 1. Introduction

The medical student is constantly at risk of physical and psychological stress given the rigorous training programs and didactic syllabus (Bostanci et al., 2005). Constant perturbation of this individual with stressors may result in

anxiety disorders. Short-term and long-term sequelae of these disorders include additional stress and anxiety, worsening academic performance, psychological or emotional impairment during professional life (which may affect quality of patient care), as well as depression and substance abuse (Gill & Mohammed, 2010).

Anxiety disorders among medical students remain a global challenge, which also reflect the mental state of the general population (Bostanci et al., 2005; Wittchen, 2002). Reports indicate that these disorders are particularly observed in the students' first academic year (Eller et al., 2006; Wittchen, 2002), and are attributed to academic stressors stemming from curriculum overload, paucity of leisure time and uncertainties which arise from the transit time between secondary school and first year in the university (Eller et al., 2006; Wittchen, 2002).

The burden of anxiety disorders among students is well documented in studies conducted outside Africa (Wittchen, 2002; Goodwin et al., 2005; Kessler et al., 2005; Leon et al., 1995; Asaad & Aqeel, 2010; Connor et al., 2001) and consists of generalized anxiety disorders (GAD), panic disorders, social anxiety disorders (SAD), phobias, post-traumatic stress disorders (PTSD) and obsessive compulsive disorders (OCDs): with reported prevalence rates of about 35%, 2.7%, 8%, 9.6%, 4.7%, and 1.3% respectively. Notably, these disorders also show a female preponderance.

SAD normally occur during communication skills-based examinations or workshops such as viva voce and clinical presentation (Laidlaw, 2009). PTSD develop following a stressful event of an exceptionally threatening or catastrophic nature (Merikangas, 2004). For medical students, PTSD usually occur after failing a medical examination or when withdrawn from the school after examination failure. In addition, they are prone to developing depression with the attendant consequences to their emotional, mental and physical well-being (Tabalipa et al., 2018).

There is paucity of data on the spectrum of anxiety disorders among medical students in Nigeria. Thus, the present study aims to determine the prevalence of anxiety disorders among these students in this clime, and the effect of socio-demographic characteristics.

## **2. Methods**

### *2.1 Study Design*

This was a cross-sectional study which assessed the spectrum of anxiety disorders among medical students who attended Enugu State University of Technology Teaching Hospital in Enugu metropolis, south-east Nigeria. The study was conducted during the examination-free period in the University to minimize the effect of bias as much as possible.

### *2.2 Study Population*

The study was carried out among medical students from second to the final year of academic study who gave their consent after explaining the optional nature of their participation and the liberty to withdraw from the study at any point. The first-year students (who were off-campus) and other students who failed to give consent were excluded. Questionnaires were administered to these students from Jan 2016 to July 2016. Socioeconomic class was assigned to the students using a method modified by Oyediji (1985).

### *2.3 Questionnaire-Based Screening Tools*

Five questionnaires were used to screen for the spectrum of anxiety disorders among these students. For SAD, the National Institute for Health and Care Excellence (NICE) recommends the use of the Mini-Social Phobia Inventory (Mini-SPIN) (Connor et al., 2001). PTSD was assessed using the 4-item Mini-SPIN which comprise four major questions with a dichotomous 'Yes' or 'No' answer. A score of 'YES' was scored 1 while a score of 'NO' was scored zero. A total score of 2 and above suggests likelihood of having PTSD (The Primary Care PTSD screen, 2016). Panic disorder was assessed with the standardized screening questionnaire which contains 8 major questions with 27 items with a dichotomous answer of 'YES' or 'NO'. An answer of 'YES' was scored 1 while a response of 'NO' was scored zero. A total score of 14 and above suggests panic anxiety disorders (The Primary Care PTSD screen, 2016). Phobia- screening questionnaire was used for specific phobias. It contains 8 items with a dichotomous 'YES' or 'NO' answer. A response of 'YES' was scored 1 while a response of 'NO' was scored zero. A total score of 4 and above suggest phobia (The Primary Care PTSD screen, 2016), OCDs questionnaire contains six items with a dichotomous 'YES' or 'NO' answer. A score of 'YES' was scored 1 while a score of 'NO' was scored zero. A total score of 3 and above suggest phobia (Tabalipa et al., 2018). For GAD, the GAD-scale was used to screen the students (Bibi & Nasir Ali, 2015). The initial item pool consisted of 8 items that reflected all of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV). The questionnaire was developed by asking the study subjects the frequency by which they were bothered by each symptom during the

last 2 weeks. Response options were 'not at all', 'several days,' 'more than half the days,' and 'nearly every day': which scored as 0, 1, 2, and 3 respectively. In addition, an item to assess duration of anxiety symptoms was included. A score of 52-100 % indicated anxiety disorder or a score of  $\geq 11$  on GAD-7 indicated anxiety (Robert et al., 2006).

#### 2.4 Data Analysis

Data were analyzed using the Statistical Package for Social Sciences program (SPSS version 20 Chicago.). Chi-square was used to test significant association for the qualitative variables while multivariate logistic regression was used to determine correlation. A p-value less than 0.05 was taken as significant for each statistical test

#### 2.5 Ethical Consideration

Ethical clearance was sought and obtained from the Ethics Committee of the Enugu State University Teaching Hospital, Enugu.

### 3. Results

Of the 217 students studied, 120 (55.2%) were female while 97 (45.8%) were male, giving a male: female ratio of 1:1.2 Majority of them were aged 21-25 years, while with respect to marital status, 85.3% were single, while 33.3% had monthly income of between 10-20 thousand Nigerian Naira (equivalent to 30-60 US dollars). (Table 1).

As shown in Table 2, 31/217 (14.3%) fulfilled the criteria for anxiety disorder. Furthermore, 86/217 (39.6%) met the criteria for GAD, 70/217 (32.3%) for PTSD, 37/217 (17.1%) for SAD, 11/217 (5.1%) for panic disorder, 73/217 (33.6%) for specific phobia and 39/217 (18.0%) for OCDs.

In Table 3, GAD was significantly related to gender ( $\chi^2 = 5.706$ ,  $p = 0.017$ ), year of study ( $\chi^2 = 12.040$ ,  $p = 0.017$ ), but not related to age ( $\chi^2 = 7.413$ ,  $p = 0.060$ ), marital status ( $\chi^2 = 3.359$ ,  $p = 0.067$ ), religion ( $\chi^2 = 0.454$ ,  $p = 0.500$ ), parents relationship ( $\chi^2 = 1.901$ ,  $p = 0.168$ ), good personal interaction with parents ( $\chi^2 = 2.030$ ,  $p = 0.154$ ), and use of tobacco ( $\chi^2 = 1.679$ ,  $p = 0.432$ ). Similarly, PTSD was significantly related to the year of study ( $\chi^2 = 10.237$ ,  $p = 0.037$ ) but not to age ( $\chi^2 = 5.568$ ,  $p = 0.135$ ), marital status ( $\chi^2 = 2.268$ ,  $p = 0.122$ ), religion ( $\chi^2 = 1.222$ ,  $p = 0.269$ ), parents relationship ( $\chi^2 = 0.024$ ,  $p = 0.877$ ), good personal interaction with parents ( $\chi^2 = 1.274$ ,  $p = 0.259$ ), and use of tobacco ( $\chi^2 = 0.757$ ,  $p = 0.685$ ) ( Table 4).

As displayed in Table 5, SAD was significantly related to the year of study ( $\chi^2 = 15.699$ ,  $p = 0.003$ ) and gender ( $\chi^2 = 4.044$ ,  $p = 0.04$ ) but not to similar variables like age ( $\chi^2 = 7.534$ ,  $p = 0.057$ ), marital status ( $\chi^2 = 0.550$ ,  $p = 0.458$ ), religion ( $\chi^2 = 0.856$ ,  $p = 0.355$ ), parents relationship ( $\chi^2 = 1.979$ ,  $p = 0.160$ ), good personal interaction with parents ( $\chi^2 = 0.251$ ,  $p = 0.616$ ), and use of tobacco ( $\chi^2 = 5.910$ ,  $p = 0.052$ ).

Interestingly, other forms of anxiety disorders showed a similar pattern of relationship with the tested variables. For instance, panic disorder (Table 6) and OCDs (Table 8) were significantly related to the year of study: ( $\chi^2 = 11.189$ ,  $p = 0.025$ ) and ( $\chi^2 = 10.918$ ,  $p = 0.028$ ) respectively. Specific phobia was significantly associated with marital status ( $\chi^2 = 8.595$ ,  $p = 0.003$ ) parents' monthly income ( $\chi^2 = 7.603$ ,  $p = 0.022$ ) and monthly allowance ( $\chi^2 = 14.929$ ,  $p = 0.002$ ) as shown in Table 7. The variables not significantly related to specific phobia were age ( $\chi^2 = 4.747$ ,  $p = 0.191$ ), religion ( $\chi^2 = 0.970$ ,  $p = 0.325$ ), parents relationship ( $\chi^2 = 0.082$ ,  $p = 0.775$ ), good personal interaction with parents ( $\chi^2 = 0.276$ ,  $p = 0.599$ ), and use of tobacco ( $\chi^2 = 3.486$ ,  $p = 0.175$ ). However, for panic disorder, there was no significant relationship with age ( $\chi^2 = 4.240$ ,  $p = 0.237$ ), marital status ( $\chi^2 = 2.004$ ,  $p = 0.157$ ), religion ( $\chi^2 = 0.738$ ,  $p = 0.390$ ), parents relationship ( $\chi^2 = 0.182$ ,  $p = 0.669$ ) and good personal interaction with parents ( $\chi^2 = 1.787$ ,  $p = 0.181$ ). OCDs were also significantly associated with marital status ( $\chi^2 = 4.489$ ,  $p = 0.034$ ) but not with age ( $\chi^2 = 7.574$ ,  $p = 0.056$ ), religion ( $\chi^2 = 0.244$ ,  $p = 0.621$ ), parents relationship ( $\chi^2 = 0.236$ ,  $p = 0.627$ ), good personal interaction with parents ( $\chi^2 = 0.863$ ,  $p = 0.353$ ), and use of tobacco ( $\chi^2 = 3.925$ ,  $p = 0.141$ ).

Table 1. Socio-demographic characteristics of respondents

<b>Variables</b>	<b>Frequency n=217</b>	<b>Percentage</b>
<b>Age(years)</b>		
≤ 20	50	.23.0
21-25yrs	104	47.9
26-30yrs	47	21.7
Above 30yrs	16	7.4
<b>Sex</b>		
Male	97	44.7
Female	120	55.3
<b>Marital status</b>		
Single	185	85.3
Others (Married, Divorced, widow)	32	14.7
<b>Tribe</b>		
Igbo	189	87.1
Others (Hausa, Yoruba)	28	12.9
<b>Religion</b>		
Christianity	204	94.0
Others (Muslim, traditional)	13	6.0
<b>Year of study</b>		
200 level	58	26.7
300 level	24	11.1
400 level	70	32.3
500 level	55	25.3
600 level	10	4.6
<b>Parent's relationship</b>		
Live together	166	76.5
Others(single, separated, widow)	51	23.5
<b>Your parent's monthly income n =187</b>		
≤100	57	30.5
101-200	48	25.7
>200	82	43.9
<b>Your monthly allowance ranges</b>		
1-10k	63	30.9
10-20k	72	35.3
21-30k	42	20.6
31-40k	27	13.2
<b>Good personal interaction with your parents</b>		
Yes	188	86.6
No	29	13.4
<b>Use of tobacco</b>		
Use of tobacco	13	8.5
Use of alcohol	51	33.3
Use of caffeinated drinks/beverages	89	58.2

Table 2. Associations between factors and anxiety disorder (AGGREGATE)

Variables	Anxiety n(%)	No anxiety n(%)	Test statistic $\chi^2$	p value
<b>Age(years)</b>				
≤ 20	17(34.0)	33(66.0)	1.146	0.766
21-25yrs	40(38.5)	64(61.5)		
26-30yrs	14(29.8)	33(70.2)		
Above 30yrs	6(37.5)	10(62.5)		
<b>Sex</b>				
Male	29(29.9)	68(70.1)	2.392	0.122
Female	48(40.0)	72(60.0)		
<b>Marital status</b>				
Single	62(33.5)	123(66.5)	2.128	0.145
Others (Married, Divorced, widow)	15(46.9)	17(53.1)		
<b>Tribe</b>				
Igbo	65(34.4)	124(65.6)	0.763	0.382
Others (Hausa, Yoruba)	12(42.9)	16(57.1)		
<b>Religion</b>				
Christianity	71(34.8)	133(65.2)	0.688	0.407
Others (Muslim, traditional)	6(46.2)	7(53.8)		
<b>Year of study</b>				
200 level	25(43.1)	33(56.9)	5.311	0.257
300 level	11(45.8)	13(54.2)		
400 level	23(32.9)	47(67.1)		
500 level	14(25.5)	41(74.5)		
600 level	4(40.0)	6(60.0)		
<b>Parent's relationship</b>				
Live together	54(32.5)	112(67.5)	2.692	0.101
Others(single, separated, widow)	23(45.1)	28(54.9)		
<b>Your parent's monthly income</b>				
≤100	20(35.1)	37(64.9)	3.121	0.210
101-200	22(45.8)	26(54.2)		
>200	25(30.5)	57(69.5)		
<b>Your monthly allowance ranges</b>				
1-10k	22(34.9)	41(65.1)	5.717	0.126
10-20k	33(45.8)	39(54.2)		
21-30k	13(31.0)	29(69.0)		
31-40k	6(22.2)	21(77.8)		
<b>Good personal interaction with your parents</b>				
Yes	64(34.0)	124(66.0)	1.277	0.259
No	13(44.8)	16(55.2)		
<b>Use of tobacco</b>				
Use of tobacco	4(30.8)	9(69.2)	3.972	0.137
Use of alcohol	14(27.5)	37(72.5)		
Use of caffeinated drinks/beverages	39(43.8)	50(56.2)		

Table 3. Associations between factors and General Anxiety Disorder

Variables	Anxiety n (%)	No anxiety n (%)	Test statistic $\chi^2$	p value
<b>Age(years)</b>				
≤ 20	12(24.0)	38(76.0)	7.413	0.060
21-25yrs	45(43.3)	59(56.7)		
26-30yrs	23(48.9)	24(51.1)		
Above 30yrs	6(37.5)	10(62.5)		
<b>Sex</b>				
Male	47(42.2)	50(51.5)	5.706	0.017
Female	39(32.5)	81(67.5)		
<b>Marital status</b>				
Single	78(33.5)	107(57.8)	3.359	0.067
Others (Married, Divorced, widow)	8(25.0)	24(75.0)		
<b>Tribe</b>				
Igbo	77(40.7)	112(59.3)	0.754	0.385
Others (Hausa, Yoruba)	9(32.1)	19(67.9)		
<b>Religion</b>				
Christianity	82(40.2)	122(59.8)	0.454	0.500
Others (Muslim, traditional)	4(30.8)	9(69.2)		
<b>Year of study</b>				
200 level	13(22.4)	45(77.6)	12.040	0.017
300 level	8(33.3)	16(66.7)		
400 level	32(45.7)	38(54.3)		
500 level	28(50.9)	27(49.1)		
600 level	5(50.0)	5(50.0)		
<b>Parent's relationship</b>				
Live together	70(42.2)	96(57.8)	1.901	0.168
Others(single, separated, widow)	16(31.4)	35(68.6)		
<b>Your parent's monthly income</b>				
≤100	22(38.6)	35(61.4)	4.161	0.125
101-200	13(27.1)	35(79.2)		
>200	37(45.1)	45(54.9)		
<b>Your monthly allowance ranges</b>				
1-10k	20(31.7)	43(68.3)	5.309	0.150
10-20k	25(34.7)	47(65.3)		
21-30k	18(42.9)	24(57.1)		
31-40k	15(55.6)	12(44.4)		
<b>Good personal interaction with your parents</b>				
Yes	78(41.5)	110(58.5)	2.030	0.154
No	8(27.6)	21(72.4)		
<b>Use of tobacco</b>				
Use of tobacco	5(38.5)	8(61.5)	1.679	0.432
Use of alcohol	24(47.1)	27(52.9)		
Use of caffeinated drinks/beverages	32(36.0)	57(64.0)		

Table 4. Associations between factors and Post-traumatic stress Disorder

Variables	Presence n (%)	Absence n (%)	Test statistic $\chi^2$	p value
<b>Age(years)</b>				
≤ 20	20(40.0)	30(60.0)	5.568	0.135
21-25yrs	30(28.8)	74(71.2)		
26-30yrs	18(38.3)	29(61.7)		
Above 30yrs	2(12.5)	14(87.5)		
<b>Sex</b>				
Male	25(25.8)	72(74.2)	2.392	0.122
Female	45(37.5)	75(62.5)		
<b>Marital status</b>				
Single	56(30.3)	129(69.7)	2.268	0.132
Others (Married, Divorced, widow)	14(43.8)	18(56.3)		
<b>Tribe</b>				
Igbo	59(31.2)	130(68.8)	0.727	0.394
Others (Hausa, Yoruba)	11(39.3)	17(60.7)		
<b>Religion</b>				
Christianity	64(31.4)	140(68.6)	1.222	0.269
Others (Muslim, traditional)	6(46.2)	7(53.8)		
<b>Year of study</b>				
200 level	26(44.8)	32(55.2)	10.237	0.037
300 level	11(45.8)	13(54.2)		
400 level	16(22.9)	54(77.1)		
500 level	14(25.5)	41(74.5)		
600 level	3(30.0)	7(70.0)		
<b>Parent's relationship</b>				
Live together	54(32.5)	112(67.5)	0.024	0.877
Others(single, separated, widow)	16(31.4)	35(68.6)		
<b>Your parent's monthly income</b>				
≤100	19(33.3)	38(66.7)	1.398	0.497
101-200	20(41.7)	28(58.3)		
>200	26(31.7)	56(68.3)		
<b>Your monthly allowance ranges</b>				
1-10k	23(36.5)	40(63.5)	2.143	0.543
10-20k	26(36.1)	46(63.9)		
21-30k	13(31.0)	29(69.0)		
31-40k	6(22.2)	21(77.8)		
<b>Good personal interaction with your parents</b>				
Yes	58(30.9)	130(69.1)	1.274	0.259
No	12(41.4)	17(58.6)		
<b>Use of tobacco</b>				
Use of tobacco	3(23.1)	10(76.9)	0.757	0.685
Use of alcohol	18(35.3)	33(64.7)		
Use of caffeinated drinks/beverages	31(34.8)	58(65.2)		

Table 5. Associations between factors and Social Panic Anxiety Disorder

Variables	Anxiety n (%)	No anxiety n (%)	Test statistic ( $\chi^2$ )	p value
<b>Age(years)</b>				
≤ 20	12(24.0)	38(76.0)	7.534	0.057
21-25yrs	21(20.2)	83(79.8)		
26-30yrs	3(6.4)	44(93.6)		
Above 30yrs	1(6.3)	15(93.8)		
<b>Sex</b>				
Male	11(11.3)	86(88.7)	4.044	0.044
Female	26(21.7)	94(78.3)		
<b>Marital status</b>				
Single	33(17.8)	152(82.2)	0.550	0.458
Others (Married, Divorced, widow)	4(12.5)	28(87.5)		
<b>Tribe</b>				
Igbo	33(17.5)	156(82.5)	0.174	0.677
Others (Hausa, Yoruba)	4(4214.3)	.24(85.7)		
<b>Religion</b>				
Christianity	36(17.6)	168(82.4)	0.856	0.355
Others (Muslim, traditional)	1(7.7)	12(92.3)		
<b>Year of study</b>				
200 level	18(31.0)	40(69.0)	15.699	0.003
300 level	5(20.8)	19(79.2)		
400 level	10(14.3)	60(85.7)		
500 level	2(323.6)	53(96.4)		
600 level	2(20.0)	8(80.0)		
<b>Parent's relationship</b>				
Live together	25(15.1)	141(84.9)	1.979	0.160
Others(single, separated, widow)	12(23.5)	39(76.5)		
<b>Your parent's monthly income</b>				
≤100	9(15.8)	48(84.2)	0.663	0.718
101-200	9(18.8)	39(81.3)		
>200	11(13.4)	71(86.6)		
<b>Your monthly allowance ranges</b>				
1-10k	10(15.9)	53(84.1)	5.605	0.132
10-20k	18(25.0)	54(75.0)		
21-30k	4(9.5)	38(90.5)		
31-40k	4(11.1)	24(88.9)		
<b>Good personal interaction with your parents</b>				
Yes	33(17.6)	155(82.4)	0.251	0.616
No	4(13.8)	25(86.2)		
<b>Use of tobacco</b>				
Use of tobacco	0(0.0)	13(100.0)	5.910	0.052
Use of alcohol	5(9.8)	46(90.2)		
Use of caffeinated drinks/beverages	19(21.3)	70(78.7)		



Table 6. Associations between factors and Panic Anxiety Disorder

Variables	Anxiety n (%)	No anxiety n (%)	Test statistic ( $\chi^2$ )	p value
<b>Age(years)</b>				
≤ 20	5(10.0)	45(90.0)	4.240	0.237
21-25yrs	5(4.8)	99(95.2)		
26-30yrs	1(2.1)	46(97.9)		
Above 30yrs	0(0.0)	16(100.0)		
<b>Sex</b>				
Male	3(3.1)	94(96.9)	1.424	0.233
Female	8(6.7)	112(93.3)		
<b>Marital status</b>				
Single	11(5.9)	174(94.1)	2.004	0.157
Others (Married, Divorced, widow)	0(0.0)	32(100.0)		
<b>Tribe</b>				
Igbo	11(5.8)	178(94.2)	1.717	0.190
Others (Hausa, Yoruba)	0(0.0)	28(100.0)		
<b>Religion</b>				
Christianity	11(5.4)	193(94.6)	0.738	0.390
Others (Muslim, traditional)	0(0.0)	13(100.0)		
<b>Year of study</b>				
200 level	6(10.3)	52(89.7)	11'189	0.025
300 level	0 (0.0)	24(100.0)		
400 level	2(2.9)	68(97.1)		
500 level	1(1.8)	54(98.2)		
600 level	2(20.0)	8(80.0)		
<b>Parent's relationship</b>				
Live together	9(5.4)	157(94.6)	0.182	0.669
Others(single, separated, widow)	2(3.9)	49(96.1)		
<b>Your parent's monthly income</b>				
≤100	2(3.5)	55(96.5)	2.512	0.285
101-200	5(10.4)	43(89.6)		
>200	4(4.9)	78(95.1)		
<b>Your monthly allowance ranges</b>				
1-10k	3(4.8)	60(95.2)	0.456	0.928
10-20k	4(5.6)	68(94.4)		
21-30k	3(7.1)	39(92.9)		
31-40k	1(3.7)	26(96.3)		
<b>Good personal interaction with your parents</b>				
Yes	11(5.9)	177(94.1)	1.787	0.181
No	0(0.0)	29(100.0)		

Table 7. Associations between factors and Specific Phobia

Variables	Anxiety n (%)	No anxiety n (%)	Test statistic ( $\chi^2$ )	p value
<b>Age(years)</b>				
≤ 20	22(44.0)	28(56.0)	4.747	0.191
21-25yrs	28(26.9)	76(73.1)		
26-30yrs	17(36.2)	30(63.8)		
Above 30yrs	6(37.5)	10(62.5)		
<b>Sex</b>				
Male	28(28.9)	69(71.1)	1.791	0.181
Female	45(37.5)	75(62.5)		
<b>Marital status</b>				
Single	55(29.7)	130(70.3)	8.595	0.003
Others (Married, Divorced, widow)	18(56.3)	14(43.8)		
<b>Tribe</b>				
Igbo	60(31.7)	129(68.3)	2.355	0.125
Others (Hausa, Yoruba)	13(46.6)	.15(53.6)		
<b>Religion</b>				
Christianity	67(32.8)	137(67.2)	0.970	0.325
Others (Muslim, traditional)	6(46.2)	.7(53.8)		
<b>Year of study</b>				
200 level	21(36.2)	37(63.8)	2.808	0.590
300 level	8(33.3)	16(66.7)		
400 level	20(28.6)	50(71.4)		
500 level	22(40.0)	33(60.0)		
600 level	2(20.0)	8(80.0)		
<b>Parent's relationship</b>				
Live together	55(33.1)	111(66.9)	0.082	0.775
Others(single, separated, widow)	18(35.3)	33(64.7)		
<b>Your parent's monthly income</b>				
≤100	25(43.9)	32(56.1)	7.603	0.022
101-200	21(43.8)	27(56.3)		
>200	20(24.4)	62(75.6)		
<b>Your monthly allowance ranges</b>				
1-10k	32(50.8)	31(49.2)	14.929	0.002
10-20k	20(27.8)	52(72.2)		
21-30k	7(16.7)	35(83.3)		
31-40k	10(37.0)	17(63.0)		
<b>Good personal interaction with your parents</b>				
Yes	62(33.0)	126(67.0)	0.276	0.599
No	11(37.9)	18(62.1)		
<b>Use of tobacco</b>				
Use of tobacco	6(46.2)	7(53.8)	3.486	0.175
Use of alcohol	22(43.1)	29(56.9)		
Use of caffeinated drinks/beverages	26(29.2)	63(70.8)		

Table 8. Associations between factors and Obsessive-compulsive disorder

Variables	Anxiety n (%)	No anxiety n (%)	Test statistic ( $\chi^2$ )	p value
<b>Age(years)</b>				
≤ 20	11(22.0)	39(78.0)	7.574	0.056
21-25yrs	18(17.3)	86(82.7)		
26-30yrs	4(8.5)	43(91.5)		
Above 30yrs	6(37.5)	10(62.5)		
<b>Sex</b>				
Male	13(13.4)	84(86.6)	2.485	0.115
Female	26(21.7)	94(78.3)		
<b>Marital status</b>				
Single	29(15.7)	156(84.3)	4.489	0.034
Others (Married, Divorced, widow)	10(31.3)	22(68.8)		
<b>Tribe</b>				
Igbo	32(16.9)	157(83.1)	1.077	0.299
Others (Hausa, Yoruba)	7(25.0)	21(75.0)		
<b>Religion</b>				
Christianity	36(17.6)	168(82.4)	0.244	0.621
Others (Muslim, traditional)	3(23.1)	10(76.9)		
<b>Year of study</b>				
200 level	18(31.0)	40(69.0)	10.918	0.028
300 level	5(20.8)	19(79.2)		
400 level	7(10.0)	63(90.0)		
500 level	7(12.7)	48(87.3)		
600 level	2(20.0)	8(80.0)		
<b>Parent's relationship</b>				
Live together	31(18.7)	135(81.3)	0.236	0.627
Others(single, separated, widow)	8(15.7)	43(84.3)		
<b>Your parent's monthly income</b>				
≤100	8(14.0)	49(86.0)	0.748	0.688
101-200	9(18.8)	39(81.3)		
>200	16(19.5)	66(80.5)		
<b>Your monthly allowance ranges</b>				
1-10k	13(20.6)	50(79.4)	4.753	0.191
10-20k	16(22.2)	56(77.8)		
21-30k	8(19.0)	34(81.0)		
31-40k	1(3.7)	26(96.3)		
<b>Good personal interaction with your parents</b>				
Yes	32(17.0)	156(83.0)	0.863	0.353
No	7(24.1)	22(75.9)		
<b>Use of tobacco</b>				
Use of tobacco	3(23.1)	10(76.9)	3.925	0.141
Use of alcohol	6(11.8)	45(88.2)		
Use of caffeinated drinks/beverages	23(25.8)	66(74.2)		

#### 4. Discussion

In the present study, the overall prevalence of anxiety disorders among medical students was 14.3%. Specifically, the relative frequencies of GAD, PTSD, SAD, panic disorder, specific disorder and OCDs were 39.6%, 32.3%, 17.1%, 5.1%, 33.6% and 18.0% respectively. The overall prevalence of anxiety disorders noted in this study is comparatively lower than the prevalence of 47% reported among medical students with multiple nationalities in Saudi Arabia: comprising Arabs, South Asians, and North Americans (Bibi & Nasir Ali, 2015). Interestingly, the study observed a higher prevalence of 63% among these students prior to examinations which rapidly declined to 47% after the examinations. Elsewhere in Malaysia, Sherina et al (2005) also noted a higher prevalence of 38.4% in their study among Malaysian medical students. Disparities between these prevalence rates may be due to study methodology, sample size, the type of questionnaire used and ethno-geographic variables. Nevertheless, the high prevalence rates of anxiety disorders among medical students underscores the need to possibly review the curriculum, examination methods, study environment and accommodation, which are all potential stressors and triggers of anxiety.

We noted in this study that GAD was significantly associated with gender and year of study. Specifically, there was a female preponderance among medical students in the clinical setting (especially 4<sup>th</sup> and 5<sup>th</sup> year of study) who exhibited this disorder, which was however least observed among the final year students. Challenges of facing new learning techniques in the clinical class such as clerking of and interacting with patients, as well as exposure to hospital environment to which these students were not hitherto exposed are all contributory factors. For the final year students, expectations to become competent doctors and to acquire good academic results may account for the low prevalence of the disorder among them (Zaid et al., 2007).

It is generally believed that females tend to have more anxiety symptoms than their male counterparts: an assumption which has been corroborated by the finding of the current study. Suggested reasons for this tendency include greater social freedom for expression of feelings, physiologic and neuro-hormonal factors ((Blanch et al., 2008; Andrade et al., 2006; Soumya et al., 2006). The prevalence rate of 32.4% for PTSD obtained in the current study is less than the rates of 21.9% and 22.9% reported by Shrestha et al (2015), and Ameel et al (2011) respectively. Again, differences in study location, the questionnaire used as screening tool for anxiety disorders and sample size may account for this disparity in prevalence rates. Interestingly, PTSD were mainly noticed in the second year of study among medical students evaluated in the current study: a period these students are exposed to cadaveric dissection in learning the subject of Anatomy. A study by Peter & Lawrence (1990) noted that approximately 5% of the students in Anatomy class reported nightmares, intrusive visual images, insomnia, depression, and learning impairments. These psychologic responses strongly resemble PTSD: making the authors to conclude that the Anatomy laboratory may represent a significant emotional challenge to many medical students, as it may represent the student's first intimate experience with illness and death (Peter & Lawrence, 1990). Furthermore, the non-significant association of PTSD with age, marital status, profession, previous disaster experience, tragic events with relatives was also corroborated by Shrestha (2015).

The prevalence rate of 33.6% for SAD reported in this study is lower than the 56% recorded in Malaysia by Gill & Mohammad (2010). Again, SAD and panic disorder appeared significantly related to the year of study. For instance, these disorders were worse among 200 level students compared to other levels of medical training. Importantly, the reason for this observation may be the commencement of exposure of the students at this level of study to morbidity and mortality stereotypes like cadaveric dissection.

The present study also found that medical students who were not married were more likely to have phobia compared to their married counterparts. In addition, students whose parents were low-income earners and students with low monthly allowance all showed more tendency to phobia compared to students whose parents were high-income earners and their counterparts with high monthly allowance. Although Ali (2013) reported no significant difference in the prevalence of social phobia with respect to gender, family income or type of residence, another author in Baghdad, Iraq (Abdul, 2012) noted a significant association of phobia among medical students with rural residence and low socio-economic background. This study shows a high tendency for married students and those from high socio-economic class to have some protection from the component anxiety disorders. Although the reason remains unclear, it has been documented that married students were significantly less susceptible to anxiety disorders compared to their single-status colleagues while those not involved in a romantic relationship were found to have significantly more anxiety disorders than those who were not (Johari & Hashim, 2009).

The prevalence of 33.6% for specific phobia obtained in this study compares well with the prevalence of 27% among medical students in the study by Ali (2013). Remarkably, it is much higher than the rates among

non-medical undergraduate students by reported Johari & Hashim (2009), who documented a life-time and 12-month prevalence of 9.4% and 8.5% respectively. The reason for this high prevalence rate of phobia among medical students when compared to their non-medical counterparts may include fear of examination failure and course-withdrawal associated with medical schools.

Finally, in the present study, OCDs were found to be significantly related to marital status and year of study. These findings are in tandem with the observations of Torres et al (2016), who noted that prevalence rates for this disorder were higher among fresher students (year 1 and 2 students). According to these authors, the 'obsession' dimension was also associated with being a 'freshman' (Torres et al., 2016).

#### 4.1 Study Limitations

The study was a single-center evaluation of medical students. Findings may not therefore be representative of these disorders among medical students in Nigeria. Secondly, the standardized questionnaires used as screening tools were self-administered and not interviewer-administered, giving room for possible wrong responses among students who might fully not have comprehended the items.

### 5. Conclusion

Medical students in Nigeria are prone to a spectrum of anxiety disorders. This susceptibility is influenced by socio-demographic characteristics.

#### Acknowledgements

We acknowledge Onyiaorah C, Udeh C and Ugwu C who helped immensely in the data collection.

#### Funding

No external funding sources for the study

#### Authors' Contribution

All authors contributed to the conception and writing of the manuscript. AEC analyzed the manuscript.

#### Disclosure

The authors hereby declare that there are no conflicts of interests.

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